

(12) UK Patent Application (19) GB (11) 2 285 910 (13) A

(43) Date of A Publication 02.08.1995

(21) Application No 9500199.6

(22) Date of Filing 06.01.1995

(30) Priority Data

(31) 9401607

(32) 28.01.1994

(33) GB

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(51) INT CL⁶

A63B 71/12, A41D 13/00, A63B 71/14

(52) UK CL (Edition N)

A3V V1A1C1 V60

(56) Documents Cited

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(58) Field of Search

UK CL (Edition N) A3V

(54) Body protectors

(57) A body protector, for example a cricket pad or a cricket glove, comprises a guard member 10 with a front surface and rear surface. The guard member is made of a foam plastics material deformable for energy absorption and to spread the force transmitted to its rear surface when subject to impact on its front surface. Cushioning means 11 is provided at the rear surface of the guard member and may be permanently or releasably attached thereto. Means 22 to 30 are provided for securing the protector to the body of a user. The guard member and cushioning means may each comprise different layers of foam of different densities. A cricket glove is described with reference to Fig. 2. The protector may be used in other sports or as industrial protective equipment.

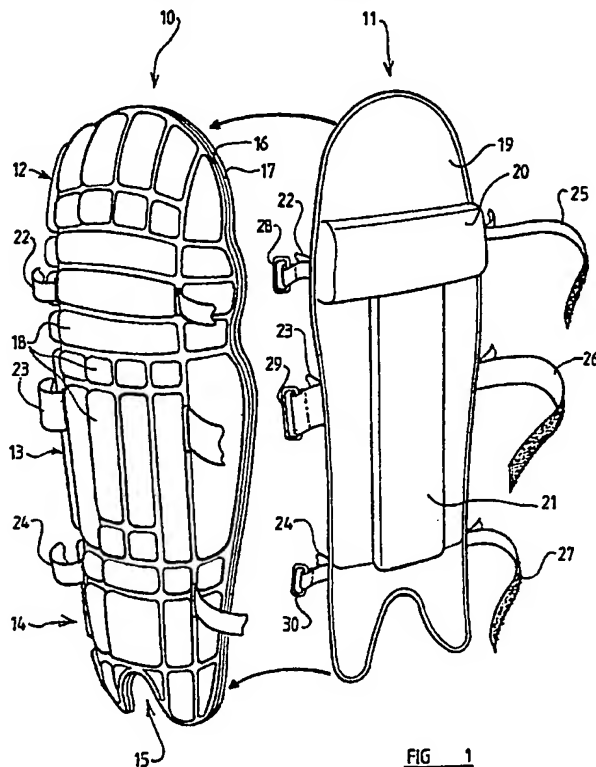
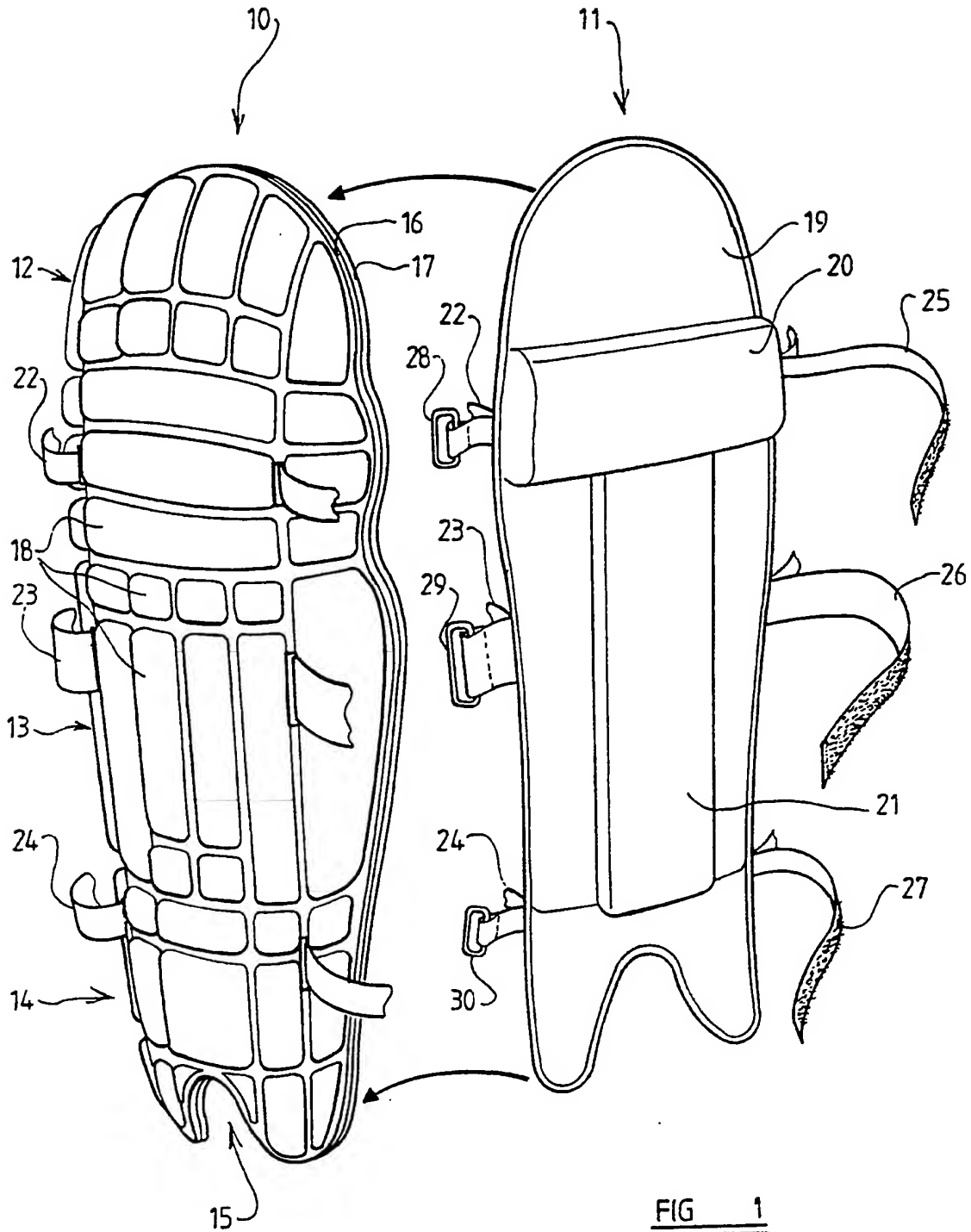


FIG 1



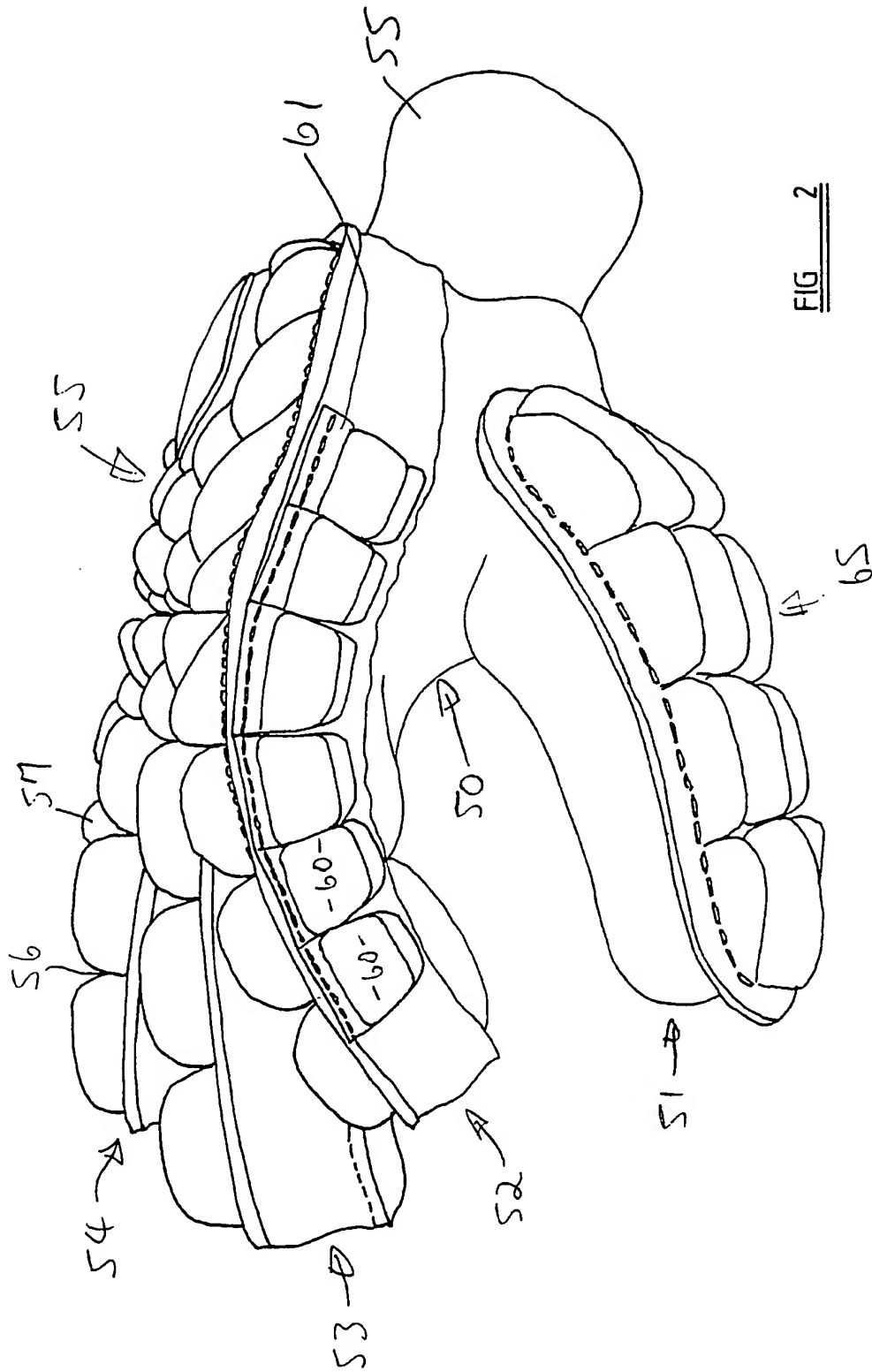


FIG 2

Title: BODY PROTECTORS

Description of Invention

This invention relates to body protectors, i.e. items of equipment for protecting the human body from injury resulting from impact with objects, such as may occur in certain sports. The invention has been devised in relation to cricket pads, as worn by batsmen to protect the knee and lower leg from injury when struck by the ball, and to gloves as worn by batsmen, but it will be appreciated that the invention is also applicable to protectors for other parts of the body and/or intended for use by participants in other sports. Further, protectors in accordance with the invention may be usable other than in the field of sports, for example as industrial protective equipment where similar or analogous hazards are encountered.

A cricket pad has to meet several requirements if it is to be satisfactory in use. Firstly it must protect the wearer from injury when struck by the ball, which when bowled by a fast bowler may be travelling at extremely high speed. Secondly, it should have rebound characteristics which are relatively "dead" in the sense that the ball should not rebound vigorously when it strikes the pad. This decreases the risk of the batsman being caught out, off bat and pad. Finally the pad should be as light as possible so as to be comfortable to use in the course of a long innings and not to hinder the batsman's running. Similar considerations apply to gloves, with the additional requirement of flexibility particularly in the fingers.

It is broadly the object of the present invention to provide a body protector, which may be a cricket pad or a glove, which meets these requirements as far as possible.

According to the present invention, I provide a body protector comprising a guard member having a front surface and a rear surface, made of a foamed plastics material which is able to be deformed so as to absorb energy

and spread the force transmitted to its rear surface when subject to impact on its front surface; cushioning means at the rear surface of the guard member, to be interposed between the guard member and a body part or parts of a person using the protector; and means for securing the protector to said body part or parts.

Preferably the guard member is of a closed cell foamed plastics material, and includes portions of foamed plastics material of different density from one another.

Preferably the foamed plastics materials of different densities from one another are disposed adjacent one another in the direction of the thickness of the guard member, and comprise a high density closed cell foamed plastics material adjacent the front surface of the guard member and a medium density closed cell foamed plastics material adjacent the rear surface of the guard member.

With such a construction, the high density material provides that the front surface of the guard member is highly resistant to impact by, for example, a cricket ball whilst the medium density material, adjacent the rear surface of the guard member, is more readily deformable than the material at the front surface of the member and provides the necessary energy absorbing and load-spreading characteristics.

The guard member conveniently is made by a press-moulding process from a sheet of the foamed plastics material which comprises layers of the high density and medium density material. By way of example only, the high density material may be approximately 4mm thick whilst the medium density material is approximately 8mm thick. Different thicknesses of material may be utilised if required, the thicknesses may be selected in accordance with the level or grade of cricket the user of the pad is intending to play.

Preferably the guard member is provided on its front surface with projections, which may be or include ribs, separated from one another by indentations such as grooves. Such indentations and grooves facilitate the bending of the guard member, where required to conform to the shape and/or movement of a body part or parts, whilst ribs assist its shape-retaining and

impact-absorbing properties where required. A front surface of such configuration means that, where the item is a cricket pad, its appearance resembles a conventional cricket pad.

Such a configuration is preferably applied to the guard member in the course of its production by press moulding, by the use of suitably configured dies.

The cushioning means may comprise a casing which is of cloth or other flexible sheet material, containing cushioning material, e.g. a foam. There may be different types of foam material and preferably there is a medium density, preferably closed cell, foam material within the casing which lies adjacent the rear surface of the guard member and a low density, preferably open cell, foam behind the first foam.

In this arrangement, the first foam provides a further cushioning and load-spreading effect in respect of forces transmitted through the guard member, while the second foam improves comfort in contact with a body part of the user.

The cushioning means may further comprise holster formations for contacting parts of the body of the user, to provide additional cushioning. In the case of a cricket pad, there may be a shin holster extending upwardly of the pad and a knee holster at the top of the shin holster, extending horizontally.

The guard member may be secured to the cushioning means by mechanical fastenings such as flexible straps which conveniently may be sewn to the cushioning means and passed through apertures in the guard member. Such fastenings may enable the guard member to be separated from the cushioning means if required. Alternatively, the guard member may be permanently secured to the cushioning means by means such as welding by fusion of the foamed plastics material of the guard member, by adhesive, or by sewing.

For securing a protector such as a cricket pad to the user, there may be straps which conveniently are provided with hook and loop fastenings.

As above referred to, a protector in accordance with the invention may comprise a glove. Such a glove may comprise a generally conventional glove structure provided, on parts thereof which might be hit by a ball or other object

in use, with cushioning means and one or more guard members in accordance with the invention.

For example, in a pair of batting gloves for cricket and intended to be used by a right handed batsman, the back of each glove and the fingers thereof may be provided with a guard member or members and cushioning means in accordance with the invention, whilst in the case of the right hand glove the thumb and the side of the index finger may be provided with further guard members and cushioning means.

The cushioning means may be incorporated in the structure of the required parts of the glove, i.e. the casing of the cushioning means may form part of the glove structure in such parts, whilst the guard member or members may be secured, e.g. by sewing, to such parts.

In the case of guard members or portions of a guard member extending down the backs of the fingers of a glove, an appropriate configuration of indentations such as grooves in the guard member, the grooves extending transversely of the finger, enables it to bend as the fingers are bent. In the case of the side of the index finger of a glove, for example, there may be guard member portions with spaces between them to enable the finger to be bent to grip a bat in use. Such spaces may be V-shaped, such that the guard member portions move together and close the spaces when the finger is bent.

The invention will now be described by way of example with reference to the accompanying drawings, of which

Figure 1 is a diagrammatic perspective view illustrating a cricket pad in accordance with the invention.

Figure 2 is a perspective view of a glove in accordance with the invention.

The cricket pad illustrated in Figure 2 comprises a guard member 10 and a cushioning assembly 11. The general configuration of the cricket pad is that which is well known for conventional cricket pads, having an upper portion 12 intended to protect the knee and lower thigh of the wearer, a mid-portion 13

to protect the shin, and a lower portion 14 having a cutaway 15, to protect the ankle of the user.

The guard member 10 is made of a laminated closed cell foamed plastics material. It comprises a portion 16 which affords a front surface of the guard member which is of high density foam and is preferably about 4mm thick, and a portion 17 which affords a rear surface of the guard member and is of medium density foam, approximately 8mm thick. The guard member is made by a press moulding process in which a sheet of the laminated foamed plastics material is pressed between dies which form the illustrated configuration of the guard member. The die which forms the front surface of the guard member is shaped to provide the guard member, on such front surface, with a pattern of ribs and projections 18 separated from one another by grooves. The illustrated configuration of such ribs and projections enables the upper portion 12 of the guard member to curve into the illustrated configuration in which the knee of a wearer may lie in a generally concave recess. The ribs 18 in the mid-portion of the guard member afford a degree of vertical rigidity to protect the shin of the wearer whilst enabling it to curve around the lower leg, whilst the configuration of ribs on the lower portion 14 of the guard member enable it to curve around the contours of the ankle of the wearer. It will also be noted that the guard member presents the general appearance of a conventional cricket pad.

The foamed plastics material of which the guard member is made is selected so that the guard member retains its shape and is durable and resistant to impact, and yet is also able to deform so as to conform generally to the configuration of the leg of the wearer. Further, it should deform to absorb energy when struck on its front surface by a ball, and to spread the force transmitted to its rear surface, and have recovery characteristics from such deformation so as to provide it with relatively "dead" rebound characteristics. By way of example, the material may be a closed cell cross-linked polyolefin foam and the densities in the portions 16, 17 may be of the order of 167 Kg/M^3 in the former and 70 Kg/M^3 in the latter.

The cushioning assembly 11 comprises a casing 19 of cloth or other flexible sheet material, of a general shape which matches that of the periphery of the guard member 10. The casing 19 may comprise front and rear sheets of cloth, sewn together around their periphery. The casing contains cushioning material which is a foam and preferably comprises two layers of such foam, namely a medium density closed cell foam which lies closer to the guard member 10 and a layer of open cell foam which lies adjacent the leg of the user. The former provides for additional energy absorption and load spreading, while the latter assists comfort. Behind the casing 19 there are disposed additional cushioning bolsters, namely a horizontal knee bolster 20 and a vertical shin bolster or bolsters 21. The bolsters 20, 21 are conveniently flexible casings containing cushioning foam.

The cushioning assembly 11 is secured to the guard member 10 by upper, middle and lower pairs of straps 22, 23, and 24 respectively which are sewn to the cushioning assembly at the periphery thereof and passed through apertures formed in the guard member. Alternatively, it would be possible for the cushioning assembly to be secured to the guard member by the use of adhesive, by welding (fusion of the portions of the plastics material of the guard member) or by other mechanical fastening means.

For securing the pad to the lower leg of the user, there are straps namely a knee strap 25, shin strap 26, and ankle strap 27. These straps comprise portions with respective cooperating elements of hook and loop (e.g. "Velcro"[™]) fastening material, intended to be passed behind the appropriate leg portions of the user, through buckles as indicated at 28, 29, 30 at the opposite side of the cushioning assembly, and secured back on itself under appropriate tension.

Although described herein in relation to a pad for protecting the lower leg part of a cricketer, it is to be appreciated that the invention is also applicable to items for protecting other parts of the body, for use in cricket and in other sports, pastimes, or occupations in which similar or analogous hazards arise. For

example, the other limbs or parts thereof may be protected, or other parts of the body.

Referring now to Figure 2 of the drawings, this shows a protector in accordance with the invention in the form of a glove. As is generally well known for gloves, it comprises a body portion indicated generally at 50 and, extending from the body portion, a thumb portion 51, and four finger portions of which the index finger portion is indicated at 52 the second finger at 53, and the third finger at 54, the fourth finger being substantially not visible in the drawing. There further is a cuff 55 for fitting around the wrist of a user of the glove, the cuff preferably having a fastening such as a hook and loop fastening, not illustrated, to enable it to be fastened around the wrist of the user for security after the glove has been donned.

The back of the body portion 50 of the of the glove and the backs of the fingers 52 to 54 are provided with cushioning means and guard members in accordance with the invention. The guard members on these parts of the glove are provided by respective portions of a member 55 which is a press-moulded sheet of laminated foamed plastics material, of appropriate configuration. Respective portions of the member 55 extend down the backs of the fingers of the glove, and are provided with transverse grooves as indicated at 56. At the grooves, the thickness of the material is reduced by the pressing of such grooves to enable the fingers to be bent relatively easily. The projections between the grooves 56, where the thickness of the guard member material is not reduced, (one of which projections is indicated at 57 for the otherwise not visible fourth finger of the glove) provide adequate energy absorption and force spreading if the fingers should be hit by a ball.

The side of the index finger 52 is provided with a number of guard member portions 60 which may be separate from one another or portions of a single guard member, the portions 60 being of tapered configuration from the back of the finger to enable the finger to be bent as illustrated. When bent, the portions 60 close up whilst when the finger is straight there are generally

V-shaped spaces therebetween. The portions 60 may be connected to one another along back edge portion 61 thereof.

The thumb portion 51 of the glove is provided with a guard member 65 on the face thereof which is exposed when the glove is in use. The guard member 65 has a configuration of grooves and projections which enables the thumb to be bent relatively easily when required.

The guard members 55, 60, 65 are secured to the glove by stitching along the edges of the respective guard members. It would be within the scope of the invention for other securing means, for example adhesive, to be utilised. Beneath the guard members, the structure of the glove includes cushioning means comprising a suitable cushioning material, e.g. foamed plastics material, which may be disposed between portions of flexible sheet material, e.g. cloth or leather and effectively form part of the structure of the glove.

If desired, the guard member portions 60 could be integral with the guard member 55, extending from an edge thereof which extends in the body portion 50 and down the index finger portion 52 thereof. Provision of a groove in such a guard member at such edge enables the portions 60 to be bent substantially at right angles to the remainder of the guard member to enable the portions 60 to be secured to the side of the finger and body portions of the glove.

By way of example, the guard members provided on the glove may be of a high density 200 Kg foam which forms the outwardly presented surface thereof, laminated to a 70 Kg foam which forms the inner surface thereof. A 15mm thick memory foam material may be attached to the inner side thereof, which is then, after press-moulding and shaping, attached to the back of the glove and to the thumb thereof. An additional layer, e.g. of 6mm thick 100 Kg foam may be provided between the inner foam of the guard member and the memory foam. It is to be appreciated, however, that the types of foam utilised, thickness thereof, method of attachment, and so on, may all be varied in accordance with specific requirements in different applications.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A body protector comprising a guard member having a front surface and a rear surface, made of a foamed plastics material which is able to be deformed so as to absorb energy and spread the force transmitted to its rear surface when subject to impact on its front surface; cushioning means at the rear surface of the guard member, to be interposed between the guard member and a body part or parts of a person using the protector; and means for securing the protector to said body part or parts.
2. A protector according to Claim 1 wherein the guard member is made of a closed cell foamed plastics material.
3. A protector according to Claim 2 wherein the guard member includes portions of foamed plastics materials of different densities from one another.
4. A protector according to Claim 3 wherein the foamed plastics materials of different densities from one another are disposed adjacent to one another in the direction of the thickness of the guard member, and include a high density closed cell foamed plastics material adjacent to the front surface of the guard member and a medium density closed cell foamed plastics material adjacent to the rear surface of the guard member.
5. A protector according to Claim 2, Claim 3 or Claim 4 wherein the guard member is made by a press-moulding process from a sheet of foamed plastics material.
6. A protector according to any one of the preceding claims wherein the guard member is provided on its front surface with projections, separated from one another by indentations.

7. A protector according to Claim 6 wherein the projections include ribs.
8. A protector according to Claim 6 or Claim 7 wherein said projections and grooves are provided on the guard member in the course of its production by press-moulding.
9. A protector according to any one of the preceding claims wherein the cushioning means comprises a casing of flexible sheet material containing cushioning material.
10. A protector according to Claim 9 wherein said cushioning material comprises a foam.
11. A protector according to Claim 10 wherein there are different types of said foam.
12. A protector according to Claim 11 comprising a medium density, closed cell foam material within the casing, which lies adjacent the rear surface of the guard member, and a low density open cell foam behind the first foam.
13. A protector according to any one of the preceding claims wherein the guard member is secured to the cushioning means by releasable mechanical fastening means.
14. A protector according to any one of Claims 1 to 12 wherein the guard member is secured to the cushioning means permanently.
15. A protector according to Claim 14 wherein the guard member is secured to the cushioning means by welding, or by adhesive, or by sewing.

16. A protector according to any one of the preceding claims which is a cricket pad.

17. A protector according to any one of Claims 1 to 15 which is a cricket glove.

18. A protector according to Claim 17 wherein the back of the glove and of the fingers thereof are provided with a guard member or members and cushioning means.

19. A protector according to Claim 18 wherein the thumb and side of the index finger further are provided with guard members and cushioning means.

20. A protector according to Claim 18 or Claim 19 wherein the guard member or members on the backs of the fingers are provided with grooves enabling bending thereof.

21. A protector according to Claim 19 or Claim 20 as appendant thereto, wherein guard member portions at the side of the index finger have spaces between them to enable the finger to be bent.

22. A protector according to Claim 21 wherein said guard member portions at the side of the finger are separate from one another.

23. A protector according to Claim 21 wherein said guard member portions at the side of the finger are integrally connected to one another.

24. A protector according to Claim 23 wherein said guard member portions are integral with a guard member extending at the back of the finger.

25. A protector substantially as hereinbefore described with reference to Figure 1 or Figure 2 of the accompanying drawings.

25. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

Relevant Technical Fields (i) UK Cl (Ed.N) A3V (ii) Int Cl (Ed.) Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii)	Search Examiner D BUCKLEY
	Date of completion of Search 3 FEBRUARY 1995
	Documents considered relevant following a search in respect of Claims :- 1 TO 25

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Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2214405 A (SACKS) see eg. lines 14 to 26 of page 4	1 to 3 at least
X	GB 2167285 A (NAVA) see eg. lines 74 to 80 of page 1	1, 2, 5 and 14 at least
X	GB 1556357 (HAYNE) see eg. lines 55 to 59 and 99 to 102 of page 2, line 109 of page 2 to 8 of page 3 and lines 45 of page 3 to 14 of page 4	1 to 10, 14, 15, 17, 18 and 20 at least
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X	GB 1545478 (ST PETER SPORTING GOODS) see eg. lines 35 to 74 and 124 to 128 of page 2	1, 2, 6, 7, 17, 18 and 19 at least
X	GB 0720140 (GEORGE) see especially lines 4 to 13 and 18 to 22 of page 2	1, 2, 9 and 10 at least

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